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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/813,509

03/29/2004

David Clarence Mullen

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01/28/2008

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EXAMINER

NGUYEN, KHAI N

ART UNIT

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2614

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,509	Applicant(s) MULLEN, DAVID CLARENCE	
	Examiner Khai N. Nguyen	Art Unit 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on October 08, 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>October</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on October 31, 2007 was filed after the filing date of the instant application on March 29, 2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Amendment

2. Applicant's amendment filed on October 08, 2007 has been entered. Claims 1, 13-15, and 20 have been amended. No claims have been canceled. No claims have been added. Claims 1-23 are still pending in this application, with claims 1, 15, and 20 being independent.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 and 13-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1 and 13-14 recite an algorithm for computing probability without any physical, useful, concrete and tangible result, and therefore these claims did not fall within at least one of the four enumerated categories of patentable subject matter recited in section 101 (i.e., process, machine, manufacture, or composition of matter).

In addition, claims 1-23 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1-23 according to the specification (Fig. 1, 122 Customer Forecast Contact, 124 Agent Arrival Prediction, page 7 lines 16-27, and page 8 lines 6-7) cited "implemented in software". Therefore, these claims are interpreted as software claims which are non-statutory.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1-6, 9-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cave (U.S. Patent Number 5,327,490) in view of Mullen (U.S. Publication 2003/0018762 A1).

Regarding claims 1 and 13-14, Cave teaches a method for forecasting availability of a resource for a work assignment (Fig. 1, 111-113 Schedule Task, col. 11, lines 60-63, i.e., schedules work assignments when agents become free), wherein said method comprises the execution of program instructions that are recorded in a computer readable storage medium, wherein said method is performed by operation of a logic circuit (Fig. 5, 51 Computer, 57 Call Control Computer, col. 4, lines 64-66), said method comprising:

selecting a forecast horizon (Fig. 1, col. 2, lines 32-40, i.e. gathers statistics about call times and agent talk times to forecast agent availability for a next call);

determining for a first segment of a first task a first probability related to an availability of at least a first resource within said forecast horizon (Fig. 2, L1, 204 and L2, 214, column 5 lines 1-4, i.e. the time that an agent is connected "talking time" to a called party "first segment of a first task a first probability", col. 11 lines 30-37, i.e., Statistics Task, segments such as "When agent is connected – talk time", "When call is completed – wrap-up time");

determining for a second segment of said first task a second probability related to said availability of said at least a first resource within said forecast horizon, wherein said first and second probabilities are different from one another (Fig. 2, L1, 204 and L2, 214, column 5 lines 1-4, i.e. wrap-up time after the call when the agent is not available for new call "second segment of a first task a second probability", col. 11 lines 30-37, i.e., Statistics Task, segments such as "When agent is connected – talk time", "When call is completed – wrap-up time");

combining said determined first probability and said determined second probability (Fig. 2, L1, AAIUT, column 5 lines 1-4); and

normalizing a result of said combining said determined first and second probabilities to obtain a probability of agent availability within said selected forecast horizon (Fig. 3C-3D, column 5, lines 10-13, i.e. to predict when each agent will be available next).

However, Cave does not specifically disclose the invention is readily to implement as computer executable instructions contained in one or more computer-readable signal-bearing media, and the detail to determine a probability. Although, Cave has described in the detail that include a computer and a call control computer, these computers perform the method of predictive dialing (Cave, Fig. 5, 51 and 57, column 4, lines 1-66).

In the same field of endeavor, Mullen discloses an apparatus and a work-management method to determine a probability of availability at a future point in time of a plurality of resources (Mullen - paragraph [0007]). Mullen teaches the detailed steps to determine the probability (Mullen - Fig. 2, and paragraphs [0019]-[0059]) and computer readable medium containing instructions (Mullen – paragraph [0011]). The advantage of Mullen's invention is the computer readable medium containing instructions which, when executed in a computer, cause the computer to perform the method steps (Mullen - paragraph [0011]). In addition, Mullen also teaches segmenting the task to facilitate an availability forecast (Mullen – paragraph [0062] lines 5-7).

Therefore, it would have been obvious to person of ordinary skill in the art at the time the invention was made to provide Cave with the detailed steps to determine the probability and the computer-readable medium to implement the method or process steps for forecasting the availability of agents to service calls, as taught by Mullen, to incorporate into Cave's method and system in order to enhance the forecasting of the availability of agents to services calls.

Regarding claim 2, Cave teaches a method wherein said first resource comprises a first agent, wherein said first probability comprises a probability that said first agent will complete a talk state within said selected horizon, said first probability derived from a time said agent has been in said talk state and a probability distribution for agent time in said talk state (Fig. 2, L1, 204, L2, 214, AAIUT, column 5 lines 14-16, i.e. AAIUT comprises "talk state" probability distribution);

and wherein said second probability comprises a probability that said first agent will complete a wrap-up state within said selected time horizon, said second probability derived from a probability distribution for agent time in said wrap-up state (Fig. 2, L1, 204, L2, 214, AAIUT, column 5 lines 14-16, i.e. AAIUT comprises "wrap-up state" probability distribution).

Cave does not specifically disclose the detail to determine a probability. However, Mullen discloses an apparatus and a work-management method to determine a probability of availability at a future point in time of a plurality of resources (Mullen - paragraph [0007]). Mullen teaches the detailed steps to determine the probability (Mullen - Fig. 2, and paragraphs [0019]-[0059]).

Regarding claims 3 and 4, Cave teaches a method wherein said first probability is determined for an actual time said at least a first agent has been in said talk state, and wherein said second probability is determined for zero time in said wrap-up state (Fig. 3C-3D – column 6, lines 23-25, column 5, lines 1-4, i.e. includes any wrap-up time "zero time or more"), and wherein said first resource comprises a first agent, wherein

said first probability comprises a combination of a probability that said first agent will complete a talk state within said selected forecast horizon and a probability that said first agent will complete a wrap-up state within said selected forecast horizon, and wherein said second probability comprises a probability that said at least a first agent will complete a total handle time state within said selected forecast horizon (Fig. 3C-3D, L1, T1 to T3, column 6, lines 47-52, i.e. AAIUT includes "talk state", "wrap-up state" and agent #1 completes the call and goes on-hook "total handle time state").

Cave does not disclose the detail to determine a probability. However, Mullen teaches the detailed steps to determine the probability (Mullen – Fig.2, and paragraphs [0019]-[0059]).

Regarding claims 5 and 6, Cave teaches a method wherein said combining comprises adding said first and second probabilities; and calculating a product of said determined first probability and said determined second probability, and wherein said normalizing comprises dividing said product by two (Fig. 2, column 5, lines 1-16, i.e. statistical computation).

Regarding claims 9 and 10, Cave teaches a method wherein a probability of arrival is calculated for a plurality of resources; and wherein said probabilities of arrival for each of said plurality of resources are combined to obtain said first forecast (Fig. 1 – i.e. shows a three agent system, column 3, lines 28-34, column 5, lines 8-10).

Cave does not specifically disclose the detailed steps. However, Mullen teaches the detailed steps to determine the probability (Mullen – Fig.3, paragraph [0060]).

Regarding claims 11 and 12, Cave teaches a method wherein said selected forecast horizon comprises a forecast time until an outbound call is completed to a live person (Fig. 2, 203, i.e., a live person comes on line, column 6, lines 42-43, column 6, lines 47-52), and a method further comprising using said first forecast to determine whether or not to place an outgoing call (column 2, lines 43-49, i.e. TSC –time to start calling).

Cave does not disclose the detail to place an outbound call. However, Mullen teaches the detailed steps to place as many outgoing calls as are expected to result in that number of calls is being answered by a person (Mullen – Fig. 3, paragraph [0060] lines 12-16).

Regarding claim 15, Cave teaches a method for forecasting arrivals of agents, comprising:

selecting a forecast horizon (Fig. 1, col. 2, lines 32-40, i.e. gathers statistics about call times and agent talk times to forecast agent availability for a next call);

forecasting the number of agents available within said selected horizon, said forecasting including:

determining a probability of completion of talk state within the forecast horizon for each of a plurality of agents (Fig. 2, L1, 204 and L2, 214, column 5 lines 1-4, i.e. an agent is connected to a called party – “talk state”);

determining a probability of completion of wrap-up state within the forecast horizon for each of said plurality of agents assuming each is at the start of wrap-up (Fig. 2, L1, 204 and L2, 214, column 5 lines 1-4, i.e. wrap-up time - “wrap-up state”);

for each of said plurality of agents, combining said determined probability of completion of talk state and said determined probability of completion of wrap-up state to obtain an agent arrival probability for each of said plurality of agents within said forecast horizon (Fig. 2, L1, AAIUT, column 5 lines 1-4, i.e. AAIUT is a combination of “talk state” and “wrap-up state”); and

combining said agent arrival probabilities for each of said plurality of agents to obtain a first forecast (Fig. 3C-3D, column 5, lines 10-13, i.e. combining AAIUT to obtain a forecast, and column 8, lines 6-7, single AAIUT for all agents).

Cave does not specifically disclose the detail to determine a probability and combine the probabilities.

However, Mullen discloses an apparatus and a work-management method to determine a probability of availability at a future point in time of a plurality of resources (Mullen - paragraph [0007]). Mullen teaches the detail steps to determine the probability (Mullen - Fig. 2, and paragraphs [0019]-[0059]) and combining the probabilities for the plurality of agents (Mullen - Fig. 3, paragraph [0060]).

Therefore, it would have been obvious to person of ordinary skill in the art at the time the invention was made to provide Cave with the detail steps to determine the probability and combine the probabilities for the plurality of agents, as taught by Mullen, to incorporate into Cave's method and system in order to enhance the forecasting of the availability of agents to services calls.

Regarding claim 16, Cave teaches a method wherein said combining said agent arrival probabilities for each of said plurality of agents to obtain a first forecast comprises:

aggregating a supply of agents as a sum of probabilities of arrival of each individual agent included in said supply of agents (Fig. 3A-3D – column 10, lines 8-10).

However, Cave does not specifically disclose the detail the sum of probabilities of arrival of agents. In the same field of endeavor, Mullen teaches the detail steps to combine the probabilities by summing them (Mullen – paragraph [0007] lines 6-8, Fig. 3, 302, paragraph [0060] lines 2-5).

Regarding claim 17, Cave teaches a method further comprising initiating an outbound call when said first forecast indicates an excess supply of agents (column 10, lines 11-15, i.e. capability of changing the number of outbound calls).

Regarding claim 18, Cave teaches a method wherein said forecast horizon is selected from one of a time corresponding to said predicted time to a live disposition on

outbound calls, an amount of time an agent is predicted to be occupied by work having a lower priority than a priority of work comprising servicing an outbound call, and an amount of time required to recall an agent from lower priority work to work comprising servicing an outbound call (column 4, lines 67-68, column 5, lines 1-4, i.e. AAIUT average agent in-use time).

However, Cave does not specifically disclose an amount of time an agent is occupied by a lower priority task. In the same field of endeavor, Mullen teaches the detail that the resources could be assigned to lower priority tasks (Mullen – paragraph [0006], and paragraph [0010]).

Regarding claim 19, Cave teaches a method wherein said first forecast is provided as an input to a predictive dialer (Fig. 1, i.e. predictive calling (dialing) algorithm, column 7, lines 56-68, i.e. AAIUT parameter is used as an input).

However, Cave does not specifically disclose the forecast is provided as an input to a predictive dialer. In the same field of endeavor, Mullen teaches the detail that the forecast is used as an input to a dialer (Mullen – Fig. 1, 114, 122, 124, paragraph [0018] lines 14-20, and Fig. 2).

Regarding claim 20, Cave teaches a work distribution system, comprising:
means for predicting a time to a next work item requiring an agent (Fig. 1, 100, and Fig. 5, 57, column 7 lines 50-52, i.e. predictive calling algorithm “100” employed within call control computer “57”);

means for accessing a first agent work segment statistic (Fig.1, 140, column 7, lines 65-68, i.e. statistics gathering task, col. 11 lines 30-37, i.e., Statistics Task, first segment such as "When agent is connected – talk time");

means for accessing a second agent work segment statistic (Fig. 1, 140, column 7, lines 65-68, i.e. statistics gathering task, col. 11 lines 30-37, i.e., Statistics Task, second segment such as "When call is completed – wrap-up time");

means for determining a first probability of completing said first agent work segment within said predicted time at an elapsed time in said first work segment by applying at least said first agent work segment statistic (Fig.1, 140, column 7, lines 65-68, i.e. statistics gathering task, col. 11 lines 30-37, i.e., Statistics Task, first segment such as "When agent is connected – talk time" and thus an elapsed time is automatically supported by the inherent in "when agent is connected - talk time");

means for determining a second probability of completing said second agent work segment within said predicted time at zero elapsed time in said second work segment by applying at least said first agent work segment statistic (Fig. 1, 140, column 7, lines 65-68, i.e. statistics gathering task, col. 11 lines 30-37, i.e., Statistics Task, second segment such as "When call is completed – wrap-up time" and thus a zero elapsed time is automatically supported by the inherent in "when call is completed – wrap-up time); and

means for combining said first and second probabilities to obtain an agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents).

However, Cave does not specifically disclose the means to determine a probability and combine the probabilities.

In the same field of endeavor, Mullen discloses an apparatus and a work-management method to determine a probability of availability at a future point in time of a plurality of resources (Mullen - paragraph [0007]). Mullen teaches the detail steps to determine the probability (Mullen - Fig. 2, and paragraphs [0019]-[0059]) and combining the probabilities (Mullen - paragraph [0062] lines 5-7).

Therefore, it would have been obvious to person of ordinary skill in the art at the time the invention was made to provide Cave with the detail steps to determine the probability and combine the probabilities, as taught by Mullen, to incorporate into Cave's method and system in order to enhance the forecasting of the availability of agents to services calls.

Regarding claims 21 and 22, Cave teaches a work distribution system further comprising means for combining agent arrival probabilities for each of a plurality of agents to obtain said agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents);

means for accessing a third agent work segment statistic, said third agent work segment spanning said first and second work segments (Fig.1, 103 AGENT # 3); and

means for determining a third probability of completing said third agent work segment within said predicted time at an elapsed time in said third work segment,

wherein said means for combining comprises means for combining said first, second and third probabilities to obtain an agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents).

Cave does not specifically disclose the means for combining of probabilities of arrival of agents. However, Mullen teaches the detail steps to combine the probabilities (Mullen – Fig. 3, 302, paragraph [0060]).

Regarding claim 23, Cave teaches a work distribution system further comprising means for placing outbound calls, wherein said agent arrival probability is provided as an input to said means for placing outbound calls (column 10, lines 11-15, i.e. outbound calls as a function of average agent in-use time).

Cave does not specifically disclose the forecast is provided as an input to a predictive dialer. However, Mullen teaches the detail that the forecast is used as an input to a dialer (Mullen – Fig. 1, 114, 122, 124, paragraph [0018] lines 14-20, and Fig. 2).

6. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cave (U.S. Patent Number 5,327,490 hereinafter "Cave'490") as applied to claim 2 above, in view of Mullen and further in view of Cave et al. (U.S. Patent No. 5,570,419 hereinafter "Cave'419").

Regarding claims 7-8, Cave'490 discloses everything claimed as applied above (see claim 1, and 2). However, Cave'490 fails to include the detail to compute the variances, a priori probability and the weighted forecasts. Although Cave'490 has described in detail the predictor gathers statistics (Fig. 6, column 2, lines 28-32, column 7, lines 65-68) and the computation of pertinent statistical parameters (Fig. 3A-3D, column 5, lines 60-67).

In the same field of endeavor, Mullen teaches a forecaster to compute variances and a priori probability of completion of servicing the call within the selected forecast horizon (Mullen, Fig. 1, 122, Fig. 2, 214, paragraph [0020], paragraph [0057]-[0058]), and in addition Cave'419 teaches a method of using weighted forecasts (Cave'419, column 5, lines 55-67, i.e. highest weight to the most recent----), the variances computation (Cave'419 column 6, lines 1-50). The advantage of Mullen method is to avoid annoying call recipients (live answer – agent was not available) with outbound calls (Mullen, paragraph [0061]), and the advantage of Cave'419 is allow a supervisor to set a target value for agent utilization (Cave'419, column 1, lines 65-67, column 2, lines 1-17).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide Cave'490 with the detail computation of variances, a priori probability and weighted forecasts, as taught by Mullen and Cave'419, to incorporate into the method and system of Cave'409 in order to enhance the forecasting of the availability of agents to services calls.

Response to Arguments

7. Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khai N. Nguyen whose telephone number is (571) 270-3141. The examiner can normally be reached on Monday - Thursday 6:30AM - 5:00PM.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ahmad F. Matar can be reached on (571) 272-7488. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KNN
01/07/2008


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